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SIMPLIFIED COST ACCOUNTING FOR MANUFACTURERS

By Walter B. Palmer,

Special Agent, United States Bureau of Foreign and Domestic Commerce.

The object of conducting business is to secure profits. Nothing that relates to manufacturing is of more importance than "costing." Efficiency rules may be applied in an excellently equipped factory, but, unless the proprietor has an adequate cost-finding system, he is liable to suffer financial loss. If he does not know, with a close degree of accuracy, what the different articles he manufactures have cost, and at what prices he can afford to sell them, he is not in a position to meet competition intelligently, and he invites business disaster. Under conditions as they existed formerly, he may have been satisfied with the profit earned on his whole line of products, as shown by his annual balance sheet, but in these days there is the keenest competition in almost every line of manufacturing, and the survival of the fittest is the inexorable law of the business world. Even if a manufacturer is satisfied with his yearly profit, which his balance sheet shows, he should know on which particular products he is making the most profit, and on which he is making only a narrow margin of profit or losing money. Intelligent costing would enable him to distinguish between the profits on different products, to discontinue the manufacture of products sold at a loss, to limit the sales of products on a small margin of profit, and to give more attention to the manufacture and marketing of products on which the largest profits are realized.

Cost accounting is especially important for manufacturers with small or comparatively small capital, in order that they may meet the severe competition of those who manufacture on an extensive scale. As a rule, the large manufacturers have, not only the most improved machinery and most efficient methods of production, but also very accurate cost-finding systems.

The comparatively small manufacturers have not been so slow in equipping their factories with up-to-date machinery and in adopting efficiency rules as they have been in planning a system by which they could know the actual costs of their different units of produc-

tion. Any investigation of this matter which may be made will show that an amazing number of American manufacturers have practically no costing system or only the crudest sorts of systems.

Most manufacturers know the cost of materials and the direct labor cost for each unit of production, but do not intelligently distribute the general expense, or "burden," or as it is commonly termed the "overhead." Many of them add to the material and labor cost for each unit what they think, judging from past experience, the charge for overhead should be, and fix prices accordingly, but if they manufacture any variety of products, such guess work will surely lead to a diminution of profit or to financial loss.

In recent years the profession of cost accounting has developed, but the small manufacturers, constituting much the larger number, have been much more backward than the large producers in adopting the methods of this branch of efficiency. They complain of the fierceness of competition, yet do not avail themselves of a costing system which would protect them against selling at a loss and insure larger profits. Perhaps the principal reason for this backwardness on the part of the small manufacturers is that they think they cannot afford to pay the fees which are charged by efficiency experts for installing cost accounting systems. A simple, inexpensive and yet accurate costing system is one of the crying needs of the small manufacturers today. Regardless of the expense of the installation of a scientific system by professional cost accountants, some of the systems are so complicated as to preclude their general use, because they are beyond the grasp of the ordinary small manufacturer.

Many small manufacturers employ as bookkeepers men, and often girls, whose accounting experience is so limited that they can scarcely prepare a profit and loss statement or an annual balance sheet, and who would be utterly unable to figure out an elaborate system of costing. And yet, simple, practicable systems can be adopted which come within the comprehension of inexperienced bookkeepers, and by means of which a satisfactory knowledge of the costs of different products can be obtained.

There are two elements of cost, raw materials and direct labor, which can be ascertained for different units with close accuracy, and these are usually the largest elements. Almost any manufacturer knows just how much raw material is used in any unit, and knows the cost of the direct labor. If he pays his employees on the piece

price basis, he knows the cost of the direct labor per unit exactly. If the direct labor, or part of it, is paid on the time rate basis he generally knows, from records of production, the average time required by his employees to produce a certain unit. Knowing the cost for materials and for direct labor, the problem is to find the proper burden for general expenses to apportion to each different unit. This is the great stumbling block in the way of an incredible number of manufacturers.

There are three systems of costing, all of them simple, which are more or less used. They may be designated the quantity method, the direct labor method and the prime cost method.

The Quantity Method

By this method the total general expense during the preceding business period, that is all expense except for raw materials and direct labor, is divided by the number of units produced, and the quotient is added to the cost of materials and direct labor for each unit. This may be expressed as follows:

$$\frac{\text{Burden, last period}}{\text{Number of units produced}} = \text{Amount of burden per unit.}$$

If, for instance, during the last period the entire cost of manufacturing and selling were $100,000, and the raw materials cost $50,000, and the direct labor $30,000, the burden amounted to $20,000. If, therefore, 10,000 units were produced during that period, the burden for each would be $2. Of course the amount for raw materials used in the computation must be the amount actually used during the last business period, and not the amount purchased, which may be more or less, and this requires that there should be inventories of raw materials at the beginning and end of the period. The amount for raw materials, that is materials used in the unit, should be kept distinct from factory supplies.

This method of costing is the simplest of all methods, and where only one kind of goods is manufactured it is the most accurate of all systems. A concern that manufactures only one kind of typewriter, for instance, would not need a more perfect system, but obviously this method is very defective if applied in a factory where goods of varying values are produced.

The Direct Labor Method

By this method the burden charge is made on the basis of the cost of the direct labor for the unit, in the proportion of the total cost of direct labor to the total amount of burden during the preceding period. This may be expressed as follows:

$$\frac{\text{Burden, last period}}{\text{Direct labor payroll}} = \text{Per cent of burden per unit.}$$

If during the last period the total direct labor cost amounted to $30,000, and the burden to $20,000, a charge of 66.67 per cent of the direct labor cost of the unit should be made for burden, that is should be added to the cost of materials and direct labor for the unit.

Where units are produced which differ in labor cost, this method is much more accurate than the quantity method, but it is defective where raw materials of different values are used in different units, for the reason that under it the more expensive grades of goods would not carry their proper proportion of burden.

The Prime Cost Method

By prime cost is meant the sum of the cost of raw materials and of direct labor. By this method the burden charge is made on the basis of the sum of the cost of raw materials and direct labor for the unit, in the proportion of the total cost of raw materials and direct labor to the total amount of burden during the preceding period. This may be expressed as follows:

$$\frac{\text{Burden, last period}}{\text{Raw materials plus direct labor payroll}} = \text{Per cent of burden per unit.}$$

If during the last period the cost of raw materials amounted to $50,000, the cost of direct labor to $30,000, a total of $80,000, and the burden amounted to $20,000, a charge of 25 per cent ($20,000 ÷ 80,000) of the prime cost of the unit would be made for the burden, that is should be added to the prime cost.

This method provides for the distribution of the burden on the unit much more accurately than the quantity method, where materials of different values are used in different units, or where more labor is employed on some units than on others; and this method is more accurate than the direct labor method, where more labor is employed on some units than on others. In costing by any method a charge should be made against the cost of the unit to cover the average loss from waste and seconds.

Any of the three methods which have been described are easy of application, even by clerks who have little accounting experience. Another method is, however, recommended as more accurate and nearly as simple. For want of a better designation, it may be termed

The Dual Method

The prime cost method is accurate for computing the burden on units which vary in the cost of materials and the cost of labor only when during the last business period the value of the products equalled the amount of the net sales. There would be an inaccuracy if the net sales amounted to more or less than the production, because the burden for the cost to sell should be computed on the amount of the net sales and not on the production.

By the dual method the ratio of burden for the unit is computed on the prime cost, during the preceding period, for indirect labor and for factory expense, because these portions of the burden are related to the amount of the production, but the selling expense is computed not on the amount of production but on the amount of the net sales. The ratio of burden for administrative expense is also computed on the amount of net sales as the base, because administrative expense is perhaps more nearly related to the amount of net sales than to the value of the production, though this may differ in different industries.

If, for example, the expenses during the last period were $50,000 for raw materials, $30,000 for direct labor, $4,000 for indirect labor, $3,000 for factory expense, $6,000 for administrative expense, and $7,000 for selling expense, making a total of $100,000, but if the net sales amounted to $110,000, the percentage of burden for the unit would be computed as shown in the following illustration:

Expenses, last period		Per cent of burden for unit
Raw materials	$50,000	
Direct labor	30,000	
Prime cost	80,000	
Indirect labor	4,000	5.00 ($4,000 ÷ $80,000)
Factory expense	3,000	3.75 ($3,000 ÷ $80,000)
Administrative expense	6,000	5.45 ($6,000 ÷ 110,000)
Selling expense	7,000	6.36 ($7,000 ÷ 110,000)
Total	100,000	
Net sales	110,000	

These percentages are used to find the burden for a unit which is intended to be sold at $10, for instance, and the cost of which for raw materials was $4.25 and for direct labor $2.55, as illustrated below:

Raw material	$4.25	
Direct labor	2.55	
Prime cost	6.80	
Indirect labor	.34	(5% of $6.80)
Factory expense	.255	(3.75% of $6.80)
Administrative expense	.545	(5.45% of $10.00)
Selling expense	.636	(6.36% of $10.00)
Waste	.043	(*e.g.*, 1% of $4.25)
Seconds	.068	(*e.g.*, 1% of $6.80)
Total cost	8.69	
Profit	1.31	(13.1% of $10.00)
Selling price	10.00	

As a matter of fact most goods are manufactured to sell at certain prices, which are determined in advance, and if the specifications, for raw material and for labor are found to be too high to allow a fair profit at the determined price, cheaper material or less labor is used.

The dual method may be varied by basing the percentage of burden for indirect labor and factory expense on the direct labor cost, instead of the prime cost, and it is claimed that for some industries, where the materials used differ but little in cost per unit, this modified method is more satisfactory.

In order to compute the burden by the dual method, accounts should be kept for the foregoing mentioned items, and they may be subdivided as appears below:

Raw Materials

Direct Labor

Wages of all employees in manufacturing occupations
Paid to contractors
Paid to home workers
Total direct labor

Indirect Labor

Salaries of officials, chargeable to manufacturing
Wages of factory superintendent and foremen

Wages of designers
Wages of employees in sample department
Wages of other general help-machinist, clerks in factory,
(not general office), floor boys and girls, etc.
(not including engineer and fireman)
Total indirect labor

Factory Expense

Rent of space used for manufacturing and shipping departments
Power, heat (or fuel and wages of engineer and fireman), light, and water
Repairs on equipment
Depreciation of equipment
Fire insurance
Workmen's compensation or employers' liability
Welfare work
State, county, township, and municipal taxes
Other factory expense
Total factory expense

Cost of Administration

Salaries of officials, not chargeable to indirect labor or cost to sell
Salaries of general office force and auditor
Rent of general office
Office supplies, stationery, postage, telegrams, telephones
Insurance—other kinds than fire
Expense of collection and legal service
Bad debts
Corporation tax
Other administrative expense
Total cost of administration

Cost to Sell

Salaries of officials, chargeable to sales department
Salaries, commissions, traveling and general expense of salesmen
Wages of other employees in sales department
Rent of showroom
Packing materials
Cartage and freight outward
Advertising
Other selling expense
Total selling expense

Waste and Seconds

Loss from waste
Loss from seconds
Total

Such accounts can be kept very easily if a specially ruled ledger is used. Some of the items under factory expense might not im-

properly be entered under cost of administration, their placement being a matter of opinion, but as these items are usually small, the result in computing the burden on a unit would be little if any affected by a transfer of them from one account to another.

In computing the proportion of burden for the unit on the basis of production and net sales during the preceding business period, the results would be more accurate if the profit and loss statement were made semi-annually, instead of annually, and still more accurate if such a statement were made quarterly. In making computations by any method it should be borne in mind that the cost of materials and direct labor, while usually the largest elements of cost, are those which are most liable to fluctuation, and in calculating the burden on the basis of the last period the differences in the cost of materials and direct labor at that time and at the time the computation is made should be taken into consideration.

When a manufacturer gets out new styles he must be particularly careful in costing if all or any part of the direct labor is paid on the time-rate basis. In making up samples for salesmen to take out on the road he should make time studies of the several direct labor operations, to ascertain as nearly as possible the direct labor cost per unit. When the goods to fill the first orders received are manufactured, he should check up his first computation by the cost to manufacture in quantities, and if there is a difference, he should adjust the selling price per unit accordingly. If it should happen that his price for goods of a certain style, as given to the salesmen, is too low to afford a profit, the earlier he checks up his first calculation of the cost for that style, the less money he will lose.

While all of the methods of costing which have been described are comparatively simple and inexpensive, and while for most factories one of these methods would be found entirely practicable and satisfactory, it is not claimed that for a highly organized factory, with many departments, any of these methods would be as accurate as one which would be adapted to the particular needs of the plant, and which might be devised by cost accounting experts after a complete, careful study of the factory conditions.

In a highly organized establishment the departmental method of apportioning burden should be adopted. Certain burden charges should be made against the whole production of the factory, certain charges against the production of particular departments only, and

other charges in part against the production of the whole factory and in part against the production of particular departments. If a cotton mill, for instance, sells yarn and cloth, the factory expense for the weave room or for the cost of indirect labor in that room should not be made a part of the burden on the product of the spinning room. In a printing plant the product that is printed only should not be charged with the expense for the bindery department.

The great need of adequate cost finding among American manufacturers has been emphasized. The subject has been discussed in national associations of manufacturers from year to year, but, so far as known, no association has approved any particular system. In many lines of manufacturing, whole industries have suffered from the general lack of intelligent costing. The unintelligent or unprogressive manufacturer often makes prices to undersell his competitors, not really knowing whether he is making or losing money on the goods he sells, but in some cases thinking he is making money when he is actually losing. So much business is done in this cut-throat manner that even establishments which have installed elaborate cost-finding systems have been forced to abandon them and revert to the ruinous policy of meeting the competition of reckless business rivals regardless of consequence. They do this to hold their trade, hoping that profits on some lines will compensate for losses on other lines. The result is that many lines of the manufacturing business are cut to pieces. The national manufacturers associations could do no greater service for their members than to urge them to adopt adequate cost-finding systems.